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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/620,072	07/15/2003	Chee Wei Wong	MIT.9923	7118

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EXAMINER

KANG, JULIANA K

ART UNIT PAPER NUMBER

2874

DATE MAILED: 04/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

H.A

Office Action Summary

Application No.

10/620,072

Applicant(s)

WONG ET AL.

Examiner

Juliana K. Kang

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 January 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 1/18/05 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

Response to Amendment

1. Applicant's communication filed on January 18, 2005 has been carefully studied by the Examiner. The arguments advanced therein, considered together with the amendments made to the claims, are not persuasive for the reasons stated set forth below. This action is made final.

The amendment filed January 18, 2005 is objected to under 35 U.S.C. 132 because it introduces new matter into the disclosure. 35 U.S.C. 132 states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: claims 1, 2, 7, 8, 12, 13, 18 and 19 are amended to recite that the membrane is flexible. This limitation was not disclosed in the original disclosure. Applicant is required to cancel the new matter in the reply to this Office Action.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

3. Claims 1, 3-5, 7, 9-12, 14-16, 18, and 20-22 are rejected under 35 U.S.C. 102(a) as being anticipated by Matsuura et al (WO 02/10843 A2).

Matsuura et al disclose a photonic bandgap microcavity comprising a membrane structure (support) that can experience strain (see page 7 lines 2-9); and a photonic bandgap waveguide element formed on said membrane structure having a defect so

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that when said membrane structure is strained, said photonic bandgap waveguide element is tuned to a selective amount (see page 2 lines 27-30, page 6 lines 16-22, page 7 lines 22-25 and page 9 lines 20-24). Matsuura et al further disclose that the invention is applied to 1-dimentional, 2-dimentional and 3-dimentional photonic crystals (see page 8 lines 26-30). Matsuura et al further disclose using a bottom electrode and a top electrode to deform the membrane structure to tune the photonic bandgap waveguide using micro-actuators including a piezoelectric actuator (see page 13 lines 27-30, page 15 lines 22-33 and page 19 lines 1-9 and line 15-17).

Please note, regarding the method claims above, that method claims parallel article claims exactly without the introduction of any particular manufacturing methods, sot that it is proper to examiner the article and method claims together.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 2 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuura et al and further in view of Caracci et al (U.S. Patent 6,445,838 B1).

Matsuura et al disclose using silicon-based substrates that can be physically deformed due to piezoelectric response but does not explicitly teach SiO₂ layer. Silica

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is well known material used in the art and furthermore Caracci et al that silica is expandable in response to the stimulus of heat or a piezoelectric material which is expandable in response to the stimulus of voltage. Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use a silicon based substrate such as SiO_2 in Matsuura et al as taught by Caracci et al to tune the waveguide element.

6. Claims 6, 8, 17 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuura et al.

Regarding claims 6, 8, 17 and 19, as described above Matsuura et al disclose the claimed invention except the claimed strain approximately 1% or strain on the membrane between 0.2 and 0.3%. Matsuura et al tuning of photonic crystal by stressing the membrane permits precise control of light traveling through the photonic bandgap waveguide (see page 3 lines 24-27, page 6 lines 1-8, and page 8 lines 26-30). Since Matsuura et al provide the same claimed structure and also teaches tuning of the photonic crystal precisely, it would have been obvious to one having ordinary skill in the art at the time the invention was made to tune the device with any desired tuning including the claimed tuning of approximately 1% or to introduce strain on the membrane between 0.2% and 0.3%, since it has been held that discovering an optimum value of a result effective variable and discovering the optimum or workable ranges involves only routine skill in the art.

Please note, regarding the method claims above, that method claims parallel article claims exactly without the introduction of any particular manufacturing methods, so that it is proper to examine the article and method claims together.

Response to Arguments

7. Applicant argues that Matsuura et al do not teach a flexible membrane structure. However as stated above the newly added limitation "flexible" introduces new matter into the disclosure of the invention and applicant is required to cancel the new matter in the reply to this Office Action.

Applicant also argues that Matsuura et al discusses photonic crystals and supports which have piezoelectric effects and the present invention has photonic crystals and microphotonic elements that do not exhibit piezoelectric effects and are furthermore not bonded to the supports that exhibit piezoelectric effects. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., photonic crystals and microphotonic elements that do not exhibit piezoelectric effects and are furthermore not bonded to the supports that exhibit piezoelectric effects) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Applicant further states that the requirement is that the piezoelectric materials are attached to the membrane structure. The Matsuura et al reference clearly teaches and shows deforming piezoelectric elements of a photonic crystal and/or support due to a piezoelectric response (see column 7 lines 1-10) wherein the photonic crystal is attached to the support (membrane structure, see Figs. 1-4).

Conclusion

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Juliana K. Kang whose telephone number is (571) 272-2348. The examiner can normally be reached on Mon. & Fri. 10:00-6:00 and Tue. & Thur. 10:00-3:00.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rod Bovernick can be reached on (571) 272-2344. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

 3/30/05
JULIANA KANG
PRIMARY EXAMINER